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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,515

10/11/2005

Shi Su

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2407

36716

7590

02/21/2007

LADAS & PARRY

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EXAMINER

KIM, TAE JUN

ART UNIT

PAPER NUMBER

3746

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/21/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/529,515

Applicant(s)

SU ET AL.

Examiner

Ted Kim

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3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03/25/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/27/2005
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of claims 14, 16 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

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2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-4, 11, 17-19, 23, 28, 29, 32 are rejected under 35 U.S.C. 102(b or e) as being anticipated by Prabhu (6,393,821). Prabhu teaches a system comprising a compressor 13 having an inlet stream and an outlet stream, a pre-heater 20 having a process inlet stream and a process outlet stream, a catalytic combustor 18 having an inlet stream and an outlet stream and containing an catalyst, and a turbine 14 having an inlet stream and an outlet stream, wherein, the outlet stream of the compressor 13 is connected to the process inlet stream of the pre-heater 20, the process outlet stream of the pre-heater is connected to the inlet stream of the catalytic combustor, and the outlet stream of the catalytic combustor is connected to the inlet stream of the turbine, and wherein, during operation of the system, the inlet stream of the compressor has a *substantially* constant and low concentration of fuel (note that each stream from 7, 8, 9, 10 is drawn off at a constant/selected fuel/air ratio – alternately, any of these streams may be mixed together with a controlled fuel/air ratio—alternately any of these streams may be mixed to a source of methane (col. 7, lines 34-47), which may be used to maintain turbine output and the blended stream of fuels has to have an appropriate energy content, i.e. regulated

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constant methane quantity, including substantially constant, alternately, note that the controller is inherently capable of maintaining a substantially constant methane quantity in order to maintain a substantially constant output); wherein the fuel comprises a gas with a methane concentration of 0.5 to 1.5 mole % (col. 6, lines 1+); wherein the fuel comprises a gas with a methane concentration of approximately 1 mole %; wherein the inlet stream of the turbine has a temperature of less than 800°C (1000 °F is much less than 800°C, see col. 8, lines 33+); further comprising a generator 16, which is connected to the turbine, wherein the generator converts the shaft work produced by the turbine into electrical energy. A system for providing fuel to drive a catalytic combustion gas turbine system, the system for providing fuel comprising a mixer (joining 7, 8, 9, 10 or unillustrated methane at col. 7, lines 34-47), having an outlet stream and at least two inlet streams and a compressor, having an inlet stream, the outlet stream of the mixer being connected to the inlet stream of the compressor, wherein, during operation of the system, the at least two inlet streams are controlled so that the outlet stream of the mixer has a substantially constant composition over time; wherein the outlet stream of the mixer has a concentration of methane of 0.5 to 1.5 mole %; wherein of the at least two inlet streams of the mixture, at least one inlet stream has a concentration of methane of 0 to 1.5 mole % and at least one other inlet stream has a concentration methane of over 20 mole % (e.g. includes substantially pure methane or landfill methane from col. 3, lines 62+); wherein at least one other stream of the at least two inlet streams of the mixer is a stream of coal mine drainage gas col. 3, lines 16+, col. 4, lines 9-15.

*Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 20, 23, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prabhu (6,393,821) in view of either Rautenbach et al (6,595,001) and/or Gabrielson et al (5,216,876). Prabhu teaches coal mine gas can be used as the source of methane gas.

Rautenbach et al teach a source of coal mine drainage gas 7' diluted with ventilation air (see Fig. 2 and col. 2, lines 55+). Gabrielson et al teach using coal mine ventilation gas (col. 4, lines 18-24) is directed to the compressor 2 of the gas turbine engine. It would have been obvious to one of ordinary skill in the art to employ coal mine drainage gas and ventilation gas, as the sources of methane in Prabhu, as well known methane sources that can have energy recovery. As for the reservoir connected to the mixer, the use of reservoirs to buffer fluctuations, is well known in the fluid flow art and would have been obvious to employ in order to dampen any fluctuations in the flow.

6. Claims 21, 22, 24, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prabhu (6,393,821) in view of either Rautenbach et al (6,595,001) and/or Gabrielson et al (5,216,876), as applied above, and further in view of Teller (3,957,464) and/or Tarnacon (5,407,647). Prabhu teaches various aspects of the claimed invention but do

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not teach the use of a scrubber for removing particles and sulphur compounds, including hydrogen sulfide and sulfur dioxide. Teller teaches using scrubbers for removing particulates greater than and equal to 0.5 microns is well known in the art (col. 4, lines 3+). It would have been obvious to one of ordinary skill in the art to remove the particulates in a scrubber, to purify the fuel gas and prolong the life of the gas turbine system. Tarancon teaches that scrubbers remove both hydrogen sulfide and sulfur dioxide (col. 1, lines 15-30) with reduction of both of these impurities to essentially zero, i.e. 99.99 to 99.999% reduction of the impurities, see col. 9, lines 11-19). Alternately, applicant's claimed ranges can be regarded as an obvious matter of finding the workable ranges in the art. It would have been obvious to one of ordinary skill in the art to employ the scrubbers to reduce the particulates and sulfur content, in order to purify the gases and prolong of the life of the gas turbine system.

7. Claims 5-10, 12-16, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prabhu (6,393,821) in view of Lipinski et al (6,125,625) and/or Rostrup-Nielsen et al (6,109,018) and optionally in view of Bell (4,936,088). Prabhu teaches various aspects of the claimed invention but do not teach various details of the catalytic combustor nor the pressure of the compressor. Lipinski et al teach a microturbine with catalytic combustor 24 and a preheater/preburner 15 and a recuperator 22 which are adjacent to each other in Fig. 2. It would have been obvious to one of ordinary skill in the art to employ a preheater and recuperator, in order to enhance the efficiency of the system. As for them being integral, making things integral has been held to be within the ordinary

skill in the art and it would have been obvious to one of ordinary skill in the art to make the preheater and recuperator integral, which has been held to be within the ordinary skill in the art. As for the pressure output from the compressor being less than 3.5 bar, Lipinski et al teach a pressure out of 3.8 bar and teaches that using lower pressures would result in higher efficiencies (col. 9, lines 55+). It would have been obvious to one of ordinary skill in the art to make the output pressure of the compressor less than 3.5 bar, in order to increase the thermodynamic efficiency. Rostrup-Nielsen et al teach the catalytic combustor 34 and a preheater 43, wherein the catalytic combustor has a maximum continuous bed surface temperature of 950°C (col. 14, lines 9-11); wherein the catalytic combustor is a honeycomb-type monolith reactor; wherein the monolith is a ceramic (col. 12, lines 13+), which acts as a substrate for a wash coat slurry of base metals on which a noble metal catalyst is placed (col. 12, lines 55+); wherein the catalytic combustor has a combustion efficiency of greater than 99% -- this ranges is well known for catalytic combustors, note that unburned hydrocarbons are in the parts per million range (see Fig. 11b). It would have been obvious to one of ordinary skill in the art to employ the catalytic combustor arrangement of Rostrup-Nielsen, in order to reduce unburned emissions during startup. Prabhu does not teach the use of a boiler, Bell teaches a boiler recovering energy 22 from the turbine outlet stream. It would have been obvious to one of ordinary skill in the art to replace the recuperator with a steam generator, as an equivalent method of recovering heat of the exhaust gas.

***Contact Information***




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Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached at 571-272-4828. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>

	
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